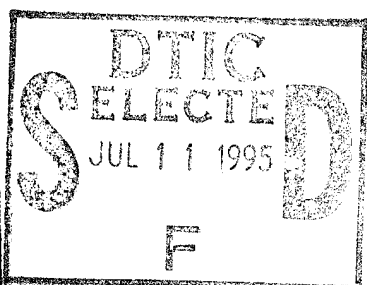


**PERSONAL  
EXPERIENCE  
MONOGRAPH**

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**1-41st FIELD ARTILLERY IN  
OPERATION DESERT STORM**



BY

**LIEUTENANT COLONEL JOHN P. FLORIS**  
United States Army

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by

**LTC(P) JOHN P. FLORIS**

**19 MAY 1992**

**U.S. ARMY WAR COLLEGE**

**CARLISLE BARRACKS, PENNSYLVANIA 17013**

PROJECT ADVISER:  
Dr. Doug Johnson

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## INTRODUCTION

The 1st Battalion, 41st Field Artillery (155, Self-Propelled) is part of the 24th Infantry Division (Mechanized) Artillery and was deployed in support of Operation DESERT SHIELD and Operation DESERT STORM from August 1990 until March 1991. It is a M109A2 equipped, 3x8 battalion that is the direct support battalion of the 1st Brigade of the Division. The Battalion began deployment to Saudi Arabia as part of DESERT SHIELD on 17 August 1990. The Battalion entered the ground phase of combat in DESERT STORM on 24 February 1991 as part of the 24th ID(M) attack to secure the Euphrates River Valley lines of communications. The observations and lessons learned by the Battalion are based upon its seven month deployment, combat operations and redeployment to CONUS in March of 1991.

The deployment provided an excellent opportunity to examine both equipment and doctrine while deployed in a desert environment and during combat operations. The lessons learned are numerous and comprehensive; however, it must be noted that the circumstances surrounding both DESERT STORM and the 24th ID(M) are indeed unique. Any lesson learned and applied must be weighed in the full context of its impact on standard Field Artillery and Combined Arms doctrines.

## BACKGROUND

The 1-41st FA was placed on alert during the early

morning hours of 7 August 1990. Initial deployment by ship to Saudi Arabia began on 17 August 1990. In the months leading up to the deployment, the Battalion underwent several major training events that would have a significant impact on the overall readiness and training posture of the unit. In retrospect, these events served to increase the readiness and deployability of the unit and markedly improve its combat capability.

In January 1990 the Battalion underwent an annual External Battalion ARTEP administered by the 24th ID(M) DIVARTY. The ARTEP served the distinct purpose of highlighting to the Battalion's leadership those areas that were combat ready and those that required training emphasis. Immediately following the ARTEP, the Battalion underwent a FORSCOM Technical Validation Inspection that verified the unit's ability to conduct special weapons operations. In each case, the Battalion was highly successful but identified training areas upon which to focus future training emphasis.

In February, the Battalion began combined arms training as part of the 1st Brigade, 24th ID(M), in preparation for a March rotation to the National Training Center. This training was intensive, comprehensive, and realistic. In March the Battalion deployed to Ft. Irwin, California and conducted a three week rotation at the National Training Center as part of a HEAVY-LIGHT rotation that included elements of the 101st Airborne Division. The rotation was successful and provided a realistic, comprehensive external

evaluation of the Battalion's ability to conduct combined arms warfare in a desert environment. The results of the rotation were used to develop the long-range training plans of the Battalion and were implemented immediately upon return to Ft. Stewart. Battery and battalion level training occupied the Battalion for the next four months as the unit trained to correct shortfalls identified during the ARTEP and National Training Center rotation.

In July key personnel from the Battalion deployed to Ft. Bragg as part of XVIII Airborne Corps to take part in Exercise INTERNAL LOOK. This exercise was focused on Southwest Asia and was, indeed, a precursor of things to come. Those individuals not participating in INTERNAL LOOK continued on battery level training and training of the 1st Battalion, 230th FA, our roundout battalion of the Georgia National Guard.

As previously stated, the Battalion was placed on alert on 7 August and began initial deployment on 17 August. The main body of the Battalion deployed by air and arrived in Saudi Arabia on 25-27 August. Equipment was downloaded in port and the Battalion deployed to initial defensive positions in Saudi Arabia beginning on the 3rd of September. From this point until the beginning of the ground war, the Battalion conducted combined arms training as part of the 1st Brigade. Training was focused on those lessons learned at the National Training Center and during the Battalion ARTEP. The soldiers soon became desert hardened and live fire,

combined arms training began in mid-September. Emphasis was placed upon combined arms training, live-fire, defense, maintenance in a desert environment, and mobility and survivability training in an NBC environment. The Battalion moved constantly and transitioned from defensive to offensive operational training in December.

The 1-41st attacked into Iraq on 24 February 1991 in direct support of the 1st Brigade, 24th ID(M) attack to secure the Euphrates River Valley lines of communications. The Battalion traveled a distance of 275 miles over a 96 hour period, controlled the fires of a reinforcing Field Artillery battalion (2-17 FA, 155 SP), and coordinated the positioning and fires of the 212th FA Brigade (2-18 FA, 203 SP and 3-27 FA, MLRS) which was the Force Artillery Headquarters for the 1st Brigade for portions of the ground war. The Field Artillery fired 2104 rounds of mixed FA munitions in support of 1st Brigade operations during the conflict. Fires were executed in a timely and accurate manner with effective results. The 1-41st fought over great distances and under adverse weather conditions while travelling at extreme movement rates. Additionally, the Battalion was under constant enemy small arms and indirect fires. The following paragraphs summarize battlefield events and observations concluding with a review of lessons learned.

## BATTLEFIELD SUMMARY

### 48 HOURS PRIOR TO THE ATTACK

The 1-41st FA occupied a tactical assembly area approximately ten kilometers south of the Iraqi border in the North Central portion of Saudi Arabia ten days prior to the beginning of the ground war. The Battalion continuously rotated the forward positioning of firing batteries to support cross border reconnaissance operations of the Division. On 22 February Task Force 4-64 Armor Scouts located an Iraqi ADA site within 15 kilometers of the Saudi border. A Battery, 1-41st FA was positioned well forward along the Iraqi border and adjusted suppressive fires to support the seizure and destruction of the ADA site. Fires were adjusted by the TF Scouts. B Battery, 1-41st FA quickly repositioned along the Iraqi border to support the mission but was not required to engage enemy targets as elements of TF 4-64 Armor quickly overran the site. On 23 February, C Battery, 1-41st FA crossed the Iraqi border with a Company Team from 4-64 Armor and penetrated approximately 20 kilometers inside Iraq to support the limit of advance of 1st Brigade Scouts. C Battery was the first Divisional artillery element to enter Iraq.

### G-DAY, INITIATION OF THE ATTACK

1-41 FA (-) crossed the border into Iraq at 1245 hours, 24 February following TF 4-64 Armor. The Battalion moved 15 kilometers into Iraqi territory, occupied a position area,

and supported the 1st Brigade seizure of its initial objectives. No missions were fired as there was no enemy contact, and 100 percent of the Battalion's vehicles and equipment successfully occupied the initial position areas. The Battalion was in these initial position areas approximately two hours, conducted refueling operations, and continued movement North over rocky terrain following TF 4-64 Armor in a Brigade box formation. The Battalion travelled in a Battalion wedge formation with batteries in column formation. Movement at this point was oriented North in the attack to secure the next 1st Brigade objective which was called Objective Red.

#### ATTACK TO SEIZE OBJECTIVE RED

The Battalion moved rapidly as part of the 1st Brigade box formation averaging approximately 20-25 kilometers per hour. On 25 February the Brigade halted to refuel prior to continuing the attack to Objective Red. The Battalion completed refueling operations retaining 100 percent of its combat vehicles and equipment. At this point, the Brigade had moved approximately 175 kilometers into Iraq. In the vicinity of Objective Red, the 1-41st FA received a mission to execute fires on dismounted Iraqi Infantry. The Battalion fired coordinated illumination, observed and adjusted by a TF 2-7 INF Scout. Fire for effect rounds resulted in the suppression and ultimate surrender of a dismounted Iraqi Infantry Company. Upon completion of the mission, the



Battalion displaced forward to occupy a position area to support preparation fires and likely enemy avenues of approach. The 212th FA Brigade assumed the Force Field Artillery Headquarters responsibility at this point, with 2-17th FA assuming the mission of reinforcing to the 1-41st FA.

#### ATTACK TO SEIZE BATTLE POSITION 102

On 26 February the Battalion attacked from Objective Red to Battle Position 102 in a Brigade box formation. The attack was initiated by a 30 minute preparation fired on known enemy positions by 155mm, 203mm and MLRS fires. The Battalion continued to travel in a Battalion wedge, battery column formation. Weather conditions (driving rain and sandstorms) created limited visibility and resulted in slow, deliberate movement. Numerous wheeled vehicles and trailers became bogged down and later had to be recovered under the direction of the Battalion Executive Officer. The Battalion attacked to seize Battle Position 102 with 23 of 24 howitzers. Incoming mortar and artillery rounds were encountered short of Battle Position 102. The Battalion conducted a hasty occupation, initialized, and aligned its attached AN/TPQ-36 Radar to acquire enemy indirect fire systems. The Q-36 supporting 2-17th FA positioned forward to provide additional support. Upon occupation of positions short of Battle Position 102, the Battalion and supporting Field Artillery fired numerous counterfire missions to silence enemy indirect fire systems. Following this intense

counterfire battle, the 1-41st FA, 2-17th FA, and 212th FA Brigade executed preparation fires in support of the 1st Brigade attack to seize Battle Position 102. The 1-41st FA massed fires upon numerous other targets as acquired by the attached Q-36 Radar and OH-58D's from the 24th Aviation Brigade. These fires destroyed at least two Iraqi Artillery battalions, an ADA site, and numerous wheeled vehicles and dismounted infantry. The Battalion's combat power remained 23 of 24 howitzers as the recovery effort to retrieve wheeled vehicles continued at a rapid pace. Upon seizure of Battle Position 102, the Battalion conducted refueling operations and initial ammunition resupply (primarily Rocket Assisted Projectiles {RAP}). During the early morning of 27 February, OH-58D pilots under the cover of darkness and limited illumination, targeted and executed the fires of 1-41st FA to destroy enemy dismounts and a wheeled convoy North of the 1st Brigade objective. Additionally, the Battalion captured and processed approximately 400 Iraqi prisoners and treated numerous enemy wounded who had been caught in the Battalion's fires.

#### ATTACK EAST TO THE RUMALIA OIL FIELDS

On 28 February, the Battalion displaced across Highway 8 following TF 3-7 INF to destroy enemy forces west of the Rumalia Oil Fields. Preparation fires were executed upon known enemy locations. The Battalion also fired numerous counterfire targets in an intense Artillery battle lasting

nearly two hours. The Battalion was credited with neutralizing two Iraqi D-30 Field Artillery battalions during the exchange. The Battalion continued to reposition and executed preparation fires on two Iraqi RGFC Infantry Brigades as supporting 212th FA Brigade assets engaged numerous deep targets. Refined enemy target locations were refired throughout the early morning hours by the Battalion and the 212th FA Brigade employing the destructive fires of the MLRS and 203mm battalions. A Presidential cease-fire was declared at 0500 hours on 1 March following a one hour Artillery preparation of known enemy targets by the entire Field Artillery force. Intermittent incoming fires continued on 1 March but were quickly silenced by massed artillery fires of the Battalion and supporting 212th FA Brigade battalions.

#### RUMALIA OIL FIELDS - CAUSEWAY ATTACK

On 2 March, Scouts from TF 2-7 INF identified a division-sized enemy column attempting to cross the Rumalia Oil Field Causeway. Elements of the enemy column fired rocket-propelled grenades on friendly forces, and a battle ensued. The 1-41st FA and supporting artillery were directed to mass fires on the leading elements and flanks of the enemy formations and causeway in an attempt to halt movement. In response, the 1-41st FA and 3-27 FA (MLRS) fired DPICM rounds on both the leading elements of the enemy formations and to the flanks. Movement was blocked; enemy fires were

neutralized, and Iraqi forces abandoned much of their equipment along the causeway. The fires of the Battalion were instrumental in halting the enemy for complete destruction by 1st Brigade direct fire systems and AH-64 Apaches of the 24th Aviation Brigade. Division battle damage assessment from this engagement included 24 T-72 tanks, 7 T-55 tanks, 43 BMP's, 15 BRDM's, 34 artillery pieces, 5 MTLB's, 377 trucks, 40 jeeps, 1 ZSU 23-4, 9 BM-21's, and 1 AMX-10.

A permanent cease-fire was declared effective 3 March 1991 at 1530 hours. The Battalion's combat power remained 23 of 24 howitzers. At this point, recovery operations and local security missions continued until the Battalion withdrew to Saudi Arabia beginning on 7 March.

#### COMBAT OPERATIONS OBSERVATIONS

The Battalion moved rapidly over long distances while maintaining pace with maneuver forces. The Field Artillery was never outranged by the M1A1 tanks and M2 Bradleys, which often moved 25-30 miles per hour across open terrain. Land navigation was simplified by use of the LORAN and Global Positioning System (GPS) devices. Equipment worked; maintenance problems were limited, and, as a result, the Battalion completed combat operations with 23 of 24 operational M109A2 Howitzers.

Firing batteries operated consolidated with platoon integrity rather than as independent platoons. This action provided increased security and centralized the ease of

control during movement, occupations, and the execution of fire missions. The decision to operate as batteries rather than platoons was made early in the deployment based upon lessons learned during a March 1990 rotation to the National Training Center and training conducted during DESERT SHIELD.

The 1-41st FA and supporting 212th FA Brigade assets executed timely and accurate fires to meet the 1st Brigade Commander's intent. The mix of munitions and fire support assets consistently achieved surprise and resulted in successful fire support execution and validated fire support planning techniques. The firing batteries proved to be fast, accurate and lethal. The Q-36 Radar proved to be one of the most critical assets on the battlefield. The radar accurately acquired enemy indirect fire systems which were quickly destroyed by massed fires. The Q-36 proved to be both mobile and dependable. This system proved most valuable as Q-37 Radars were unavailable due to maintenance and mobility problems.

The 1-41st FA planned fires digitally (TACFIRE) and executed by voice. Digital execution seldom occurred, given the distances involved in the exploitation. Voice clearance of fires were most often necessary, and the FIST's were not consistently in position to observe fires given the distance and pace of movements of the maneuver forces. The FIST-V experienced difficulty in keeping pace with the M1A1's and M2's in the exploitation which routinely saw maneuver companies advance at speeds in excess of 25 miles per hour.

TACFIRE was consistently positioned forward and remained operational throughout the conflict. Early in the deployment, the shelter and one 15 kilowatt generator were mounted on a HEMMT for mobility and continuous operations (during movement). This transition eliminated all mobility problems and allowed for TACFIRE control while on the move.

Management of ammunition was not a problem within the Battalion. The Battalion carried 5472 complete rounds spread among 24 M109A2 Howitzers (36 rounds per), 24 M548 Cargo Carriers (72 rounds per), and 20 HEMMT's (144 rounds per). The M548's were not configured to carry their designed loads (96 rounds) due to the inability of the vehicle to keep pace with the M109A2's in the desert environment. Nevertheless, the M548's had difficulty keeping pace with the mechanized force during offensive operations. DPICM and RAP were the two munitions of choice during combat operations, and each proved to be highly effective. Ammunition resupply operations were conducted twice without any delays or problems.

The FIST-V fleet maintained a high operational readiness rate during combat operations. This is attributed to the fact that the Commanding General identified the FIST-V as the priority vehicle in the Division. Early in the deployment, the FIST-V received the priority of the Division maintenance effort, and, as a result, the system retained readiness rates in excess of 90 percent during the entire ground war. However, the FIST-V was unable to keep pace with the M1A2's

and M2's of the maneuver Battalions during the offense, and this shortcoming, in effect, resulted in the Fire Support Sections moving to alternative vehicles or being left out of the execution of fires. During deep offensive operations such as the exploitation, the system is simply outpaced by the Armor and Mechanized Infantry forces.

For much of the operation, the 1st Brigade TOC was outdistanced by the lead maneuver elements, thus removing the Brigade Fire Support Officer (FSO) from the fight. As a result, the Direct Support Battalion Commander was forced to assume the role of both Fire Support Coordination Officer (FSCoord) and FSO. This problem was discussed with the 1st Brigade Commander and an alternative configuration proposed. With the 1st Brigade Commander's approval, the problem was alleviated by the Brigade Fire Support Element (FSE) colocating with the Brigade TAC rather than the Brigade TOC. This placed the Brigade FSO and FSNCO forward with the FSCoord and allowed them to concurrently fight the current battle and plan future operations. A senior Field Artillery captain from the 1-41st FA was placed in the Brigade TOC to assist in planning from that location.

Timely clearance of fires was a constant problem during the exploitation but proved effective as the Iraqi force was most often entrenched and non-mobile. The positive aspect of this issue is that there were no instances of artillery fratricide in the Brigade. Fire missions were initiated as preparation fires, counterfire, or observed fires directed by

maneuver scouts, OH-58D's or FA observers. The voice clearance process was most often conducted by the Brigade FSCoord linking directly with a Battalion FSO who was in contact with an observer. Any delay in fire mission processing was created by the fluid battlefield situation of the 1st Brigade's exploitation mission.

### LESSONS LEARNED

In an offensive action of this nature, the Brigade FSE must locate with the Brigade TAC rather than the Brigade TOC. This places the Brigade FSO and his essential equipment forward to clear and control fires. For this same rationale, Battalion FSO's must fight out of their Battalion TAC's or TOC's rather than colocating with TF commanders. Such configurations ensure quick, timely and accurate fires initiated at the FIST level.

TACFIRE must be mounted on a HEMMT. This ensures mobility over rough terrain and constant operations even while on the move. The 1-41st FA mounted its TACFIRE Shelter and one 15 KW generator on a HEMMT. The same HEMMT towed the second 15 KW generator mounted on a trailer. Mobility was never a problem in this configuration, and digital communications were maintained even on the move. A 100 amp generator kit must be installed as part of this configuration to sustain operations while on the move.

The M548 and FIST-V must be replaced by modern systems designed to keep pace with the modern mechanized force.



Although both systems were effective during the war, they were simply unable to sustain the required pace. The M548 should be replaced by the CAT-V or HEMMT and the FIST-V replaced by either the M113A3 or M2 type chassis configured with the GLLVD and targeting station capabilities. Another option for replacement of the FIST-V which should be considered is the HMMWV fitted with Kevlar protection. By contrast, the M109A2 performed superbly and kept pace within the M1A2 and M2 equipped Brigade.

The Global Positioning System (GPS) and LORAN proved invaluable for desert navigation. Sufficient GPS's or LORAN's should be procured for each FIST, COLT, and firing battery platoon leader. Additionally, support sections such as the Ammunition Platoon and Battalion Maintenance Sections should also be equipped with navigational aids. The GPS-9 also proved invaluable for the conduct of Survey Section operations. Seldom did a satellite window close with the system tracking. The GPS-9 provided the Battalion a common source for location and allowed for forward rotation in sector of two different master stations for common direction. PADS also proved effective and dependable during combat operations.

The Q-36 Radar was an overwhelming success yet experienced continued difficulties with desert mobility. The Q-37 Radar was never involved in the fight due to mobility and maintenance problems. Both systems should be mounted on 900 series 5-Ton vehicles to improve mobility. In addition,

the same series trucks should serve as the secondary mover for transport of the 15 KW generator trailer assemblies.

Direct Support FA battalions require two M-88's for their maintenance recovery operations. The current M578's are not powerful enough systems for track recovery, particularly in the case of the M109A2 operating in a desert environment. This addition would also permit the flexibility of placing one M578 with each firing battery while maintaining a battalion level heavy recovery capability.

Independent platoon operations were not conducted in Iraq. Consolidation of firing platoons into battery operations maximized command and control, security, movement and execution of fires. Platoons never travelled more than 500 meters apart during the conflict and operated with one platoon fire direction center hot and one cold. Thus, 24 hour operations were sustained with great effectiveness.

The Battalion travelled well in the desert employing nonstandard FA movement formations. Rather than moving in a column and conducting deliberate occupations, the Battalion moved much like maneuver battalions (FIGURE 1). This movement configuration was most often a tactical battalion diamond with batteries in a platoon wedge. Movement was fast, survivability increased, and hasty occupations were the norm. The Battalion routinely occupied and was safe to fire in less than eight minutes while still meeting the requirements for accurate, predicted fires.

DPICM and RAP proved to be highly effective battlefield

munitions. Enemy prisoners pleaded with U.S. forces to halt the firing of "artillery rain" and "rocket rounds." The accuracy of both munitions was excellent and their effects devastating. Charge 7 Red Bag propellant was accurate and effective as a result of the Battalion deriving muzzle velocities in training prior to the outbreak of hostilities.

The maintenance readiness rate of the M109A2 Howitzer was excellent and consistently above 95 percent. It was learned early in DESERT SHIELD that PMCS alone was not enough. The system requires long periods of operation in the desert to maximize the capabilities of the diesel engine and major end items, as well as educating drivers in desert operations. Early in the deployment, the Battalion conducted weekly, long distance road marches over rough desert terrain to exercise the systems. This action not only provided the proper stress on the systems but also identified problems which could have effected operations later during the war.

Perhaps the paramount lesson learned is that of the importance of the National Training Center. The tough, realistic, and demanding training that is conducted during these rotations was instrumental in the success of the Battalion. Soldiers and officers fought as they had trained and found the Iraqi forces more forgiving than the Observer Controllers and OPFOR at Ft. Irwin. It is significant to note that over 80 percent of the Battalion's leadership had undergone at least one rotation and 60 percent two rotations at the National Training Center. To a man, there was uniform

agreement that these rotations formed the basis for the Battalion's success. Fire Support, logistics, and individual training, planning, and execution were in complete compliance with the lessons learned in the desert of Ft. Irwin.

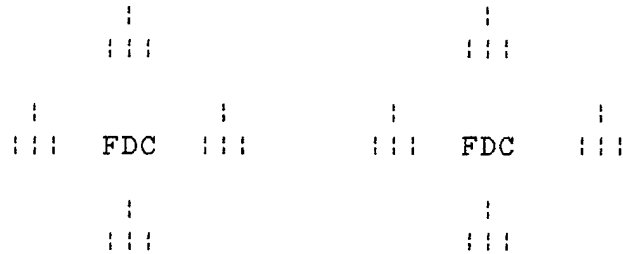
### CONCLUSION

The soldiers of the 1-41st FA performed their mission in the greatest spirit of the Field Artillery. Their commitment to excellence and sense of professionalism made the difference. The equipment worked well, with some well beyond specifications. This success can largely be attributed to aggressive training and maintenance programs which were refined at the National Training Center and perfected in the Saudi Desert during the months leading up to the ground war. The realistic training provided by the Observer Controllers at the National Training Center coupled with the 24th ID(M) emphasis on combined arms live fire exercises were the ultimate difference.

1-41 MOVEMENT CONFIGURATION

A BATTERY

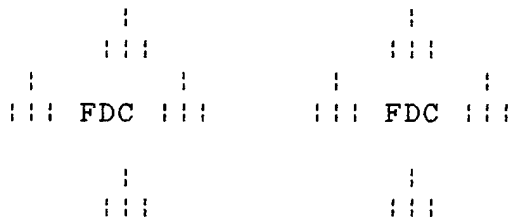
BTRY CDR/BN SURVEY SECTION



BATTERY TRAINS  
BN JUMP TOC (S3/FDO)

B BATTERY

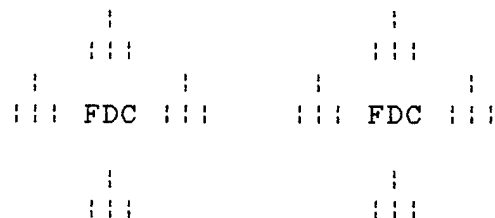
BTRY CDR



BTRY TRAINS

C BATTERY

BTRY CDR



BTRY TRAINS

BATTALION  
TOC  
(ASSISTANT S-3/ASSISTANT FDO)

BATTALION COMBAT  
TRAINS

FIGURE 1